

Code: 13A03301

R13

B.Tech II Year I Semester (R13) Supplementary Examinations June 2015

MATERIAL SCIENCE AND ENGINEERING

(Mechanical Engineering)

Time: 3 hours

Max. Marks: 70

PART - A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- (a) What is metallic bond? Give an example.
 - (b) What is the necessity of alloying?
 - (c) What is the lever rule?
 - (d) What is an eutectic system?
 - (e) What do you mean by red-hardness?
 - (f) List the applications of tool steels.
 - (g) What is age hardening?
 - (h) How is annealing different from normalizing?
 - (i) What are crystalline ceramics? Give an example.
 - (j) Classify composites.

PART - B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT - I

- 2 Explain about the effect of grain boundaries on the properties of alloys.
- OR
- 3 What are the various types of solid solutions? Discuss and give examples.

UNIT - II

- 4 Draw the Fe-Fe₃C equilibrium diagram to scale on a graph paper and label all points, lines and areas.
- OR
- 5 Draw an equilibrium diagram for a Cu-Ni system to scale and label all the points. Explain its important features.

UNIT - III

- 6 Classify cast irons? List their properties.
- OR
- 7 Discuss about the structure and properties of titanium and its alloys.

UNIT - IV

- 8 What are TTT diagrams? How are they prepared? What is their significance?
- OR
- 9 What is cryogenic treatment? How is it done for the alloys? Discuss.

UNIT - V

- 10 What are glasses? Discuss about their micro structure and properties.
- OR
- 11 Explain about various methods of component manufacture of composites.
